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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/651,334	08/31/2000	Mark J. Bailey	ROC9-2000-0158-IBM-191	3888

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EXAMINER	
ALCALA, JOSE H	
ART UNIT	PAPER NUMBER
2827	

DATE MAILED: 04/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/651,334	BAILEY ET AL.
	Examiner	Art Unit
	Jose H Alcala	2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 28 December 2001.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-29 is/are pending in the application.

4a) Of the above claim(s) 4,13-19 and 22 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-3,5-18 and 23-29 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on 28 December 2001 is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The corrections of the drawings were received on 12/28/01. These drawing corrections are acceptable.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-3,5-12, 20-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: where exactly is the conductive pad located in relation to the hole, to the insulating layer and to the conducting layer. In addition the recitation: “a majority thereof within an area defined by an outer periphery of the hole” is vague, and is not sufficient to clearly establish the structural cooperative relationship of the elements of the circuit board.

Regarding claims 6, it is not clear if the conductive layer is either a signal layer or a ground layer that is close to a signal layer.

Regarding Claims 20 and 25, the recitation “signal ground layer” is vague; it is not clear if the layer is either a signal layer or a ground layer that is close to a signal layer.

Claim Rejections - 35 USC § 102

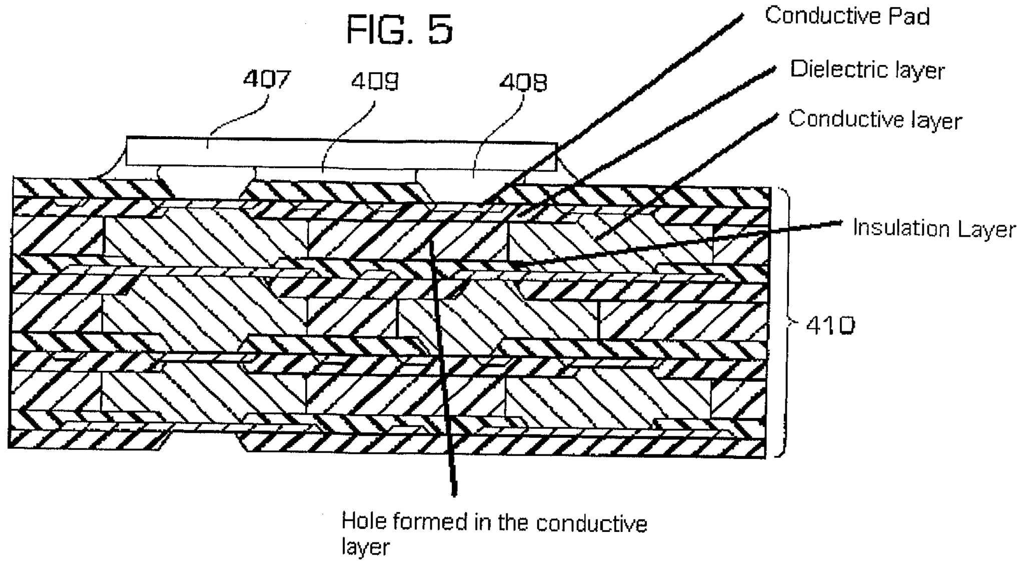
4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3,6-8,11 and 20-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Tsukamoto et al. (US Patent No. 6,281,448). As best understood by the examiner:

Regarding Claim 1, Tsukamoto teaches a surface laminar circuit board, comprising: an insulating layer (see Figure 5 below); a conductive layer (see Figure 5 below); disposed on an upper surface of said insulating layer, said conductive layer having a hole formed therein (see Figure 5 below); a dielectric layer (see Figure 5 below) disposed on an upper surface of the conductive layer; and a conductive pad (See Figure 5 below) having a majority thereof within an area defined by an outer periphery of the hole, said conductive pad being for receiving a surface mounted component (Reference number 407) thereon.

FIG. 5



Regarding Claim 2, Tsukamoto teaches that the dielectric layer is a photosensitive dielectric layer (column 9, lines 59-62).

Regarding Claim 3, Tsukamoto teaches that said photosensitive dielectric layer is in direct contact with the insulating layer by way of the hole (See Figure 5, inside the hole), and wherein said conductive pad (See Figure 5) is disposed directly on an upper surface of said photosensitive dielectric layer (See Figure 5), said dielectric layer separating said conductive pad from said conductive layer and from said insulating layer. (See Figure 5).

Regarding Claim 6, Tsukamoto teaches that said conductive layer comprises a signal layer (It is inherent that the conductive layer, which is a wiring layer, can be used as a signal layer).

Regarding Claim 7, Tsukamoto teaches that said signal ground layer is comprised of copper (column 9, lines 45-50).

Regarding Claim 8, the limitation "said hole is formed by etching", is a product by process limitation. Even though the claims are limited by and defined by the recited process, the determination of patentability of the product is based on the product itself, and does not depend on its method of production. If the product in the product-by-process claims are the same as or obvious from a product of the prior art, the claims are unpatentable even though the prior product was made by a different process. See In re Thorpe, 227 USPQ 964,966 (Fed.Cir 1985). A "product by process" claim is directed to the product per se, no matter how actually made, In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); In re Marosi et al, 218 USPQ 289; and particularly In re Thorpe, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear.

Regarding Claim 11, Tsukamoto teaches further comprising signal traces (Reference number 107, discloses wiring that can inherently be used as a signal trace) disposed directly on said photosensitive dielectric layer.

Regarding Claim 12, Tsukamoto teaches that said conductive pad (Reference number 306) is disposed completely within the area defined by the outer periphery of the hole. See figure 5.

Regarding Claim 20, Tsukamoto teaches a surface laminar circuit board, comprising: an insulating layer (Reference number 406, below the hole in Figure 5); a signal ground conductive layer (Reference number 404); disposed on an upper surface of said insulating layer, said conductive layer having a hole (the space between the two elements with Reference number 404) formed therein; a photosensitive dielectric layer (Reference number 406, over the hole in Figure 5) disposed on an upper surface of the signal ground conductive layer, said dielectric layer having a photo micro-via (See top portion of insulating layer on top of Figure 5) formed therein; a signal trace (Reference number 1205) disposed on said photosensitive dielectric layer, and being electrically coupled with said signal ground conductive layer by way of said photo micro-via (See Figure 13C); a conductive pad (Reference number 306) having a majority thereof within an area defined by an outer periphery of the hole (See Figure 5), and being electrically coupled with said signal trace; and a surface mounted component (Reference number 407) mounted on said conductive pad.

Regarding Claim 21, Tsukamoto teaches that said photosensitive dielectric layer (Reference number 402) is in direct contact with the insulating layer (Reference number 403) by way of the hole, and wherein said conductive pad is disposed directly on an upper surface of said photosensitive dielectric layer, said dielectric layer separating said conductive pad from said conductive layer and from said insulating layer. See Figure 5.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 5,9,10 and 23-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukamoto et al. (US Patent No. 6,281,448). As best understood by the examiner:

Regarding Claim 5, Tsukamoto teaches all the limitations of Claim 1 as stated supra, but fails to explicitly teach that said insulating layer is an FR4 insulating layer. It would have been obvious to one having ordinary skill in the art at the time the invention was made, to make said insulating layer an FR4 insulating layer, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding Claim 9, Tsukamoto teaches that said photosensitive dielectric layer has a thickness (it is inherent to the device), in a region over the conductive layer, but fails to explicitly teach that the thickness is less than about 50 micrometers. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the thickness less than about 50 micrometers in order to improve integration and reduce the use of material, since it has been held that where the general conditions of a claim are disclosed in

the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding Claim 10, Tsukamoto teaches that said photosensitive dielectric layer has a thickness, (it is inherent to the device), in a region over the conductive layer, but fail to explicitly teach that the thickness is equal to or less than about 40 micrometers. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the thickness equal to or less than about 40 micrometers in order to improve integration and reduce the use of material, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding Claim 23, Tsukamoto teaches a surface laminar circuit board, comprising: an insulating layer (see Figure 5 above); a sheet of conductive material (see Figure 5 above) disposed on an upper surface of said insulating layer, said sheet of conductive material having a hole (see Figure 5 above) formed therein, the sheet of conductive material completely surrounding an area defined by the hole (See figure 5 above), a dielectric layer (see Figure 5 above) disposed on an upper surface of said conductive material; and a conductive pad (See Figure 5 above) having a major portion thereof disposed directly the insulating layer, said conductive pad being for receiving a surface mounted component (Reference number 407) thereon.

Tsukamoto et al. fails to explicitly teach that the hole exposes a portion of said insulating layer, and that the area is in registration with, and corresponding in shape and size, to the portion of said insulating layer exposed by the hole; and that a major portion

thereof is disposed directly over the portion of said insulating layer exposed by the hole. It would have been obvious to one of ordinary skill in the art at the time the invention was made to completely empty a hole inside the conductive layer in order to reduce the use of material and making the device lightweight, since it has been held that omission of an element and its function in a combination where the remaining elements perform the same function as before involves only routine skill in the art. In re Karlson, 136 USPQ 184.

Regarding Claim 24, Tsukamoto teaches that the dielectric layer is in direct contact with the portion of said insulating layer exposed by the hole (See Figure 5, inside the hole), and wherein said conductive pad (See Figure 5) is disposed in direct contact with an upper surface of said dielectric layer, said dielectric layer separating said conductive pad from said conductive material and from said insulating layer (See Figure 5).

Regarding Claim 25, Tsukamoto teaches that said conductive layer comprises a signal layer (It is inherent that the conductive layer, which is a wiring layer, can be used as a signal layer).

Regarding Claim 26, Tsukamoto teaches that said photosensitive dielectric layer has a thickness (it is inherent to the device), in a region over the conductive layer, but fails to explicitly teach that the thickness is less than about 50 micrometers. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the thickness less than about 50 micrometers in order to improve integration and reduce the use of material, since it has been held that where the general conditions of a claim are disclosed in

the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding Claim 27, Tsukamoto teaches that said photosensitive dielectric layer has a thickness, (it is inherent to the device), in a region over the conductive layer, but fail to explicitly teach that the thickness is equal to or less than about 40 micrometers. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the thickness equal to or less than about 40 micrometers in order to improve integration and reduce the use of material, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding Claims 28 and 29, the modification of Tsukamoto teaches that all of said conductive pad is disposed over the portion of said insulating layer exposed by the hole. (See Figure 5)

Response to Arguments

8. Applicant's arguments with respect to claims 1-3,5-12,20 and 21 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references show some of the elements of the instant claimed invention: Feilchenfeld et al. (US Patent No. 5,798,563), Freyman et al.

(US Patent No. 5,006,673), Adachi et al. (US Patent No. 4,993,148) and Adachi et al. (US Patent No. 5,081,562).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jose H Alcala whose telephone number is (703) 305-9844. The examiner can normally be reached on Monday to Friday.

11. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3431 for regular communications and (703) 305-3431 for After Final communications.

12. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JHA
April 22, 2002

K Cuneo
Primary Examiner